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# ADDITIONAL RODENT MATERIAL FROM THE SPLIT ROCK LOCAL FAUNA, MIOCENE OF WYOMING

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The Split Rock local fauna, Split Rock Formation, Natrona County, Wyoming (Love, 1961), is well known to paleontologists interested in Tertiary mammals. This fauna is generally regarded as Hemingfordian in age, more or less equivalent to the Sheep Creek fauna of Nebraska (Schultz and Falkenback, 1968). The literature contains accounts of many of the faunal elements represented in this local fauna; however many previous descriptions have been based on isolated teeth (Black and Wood, 1956; Black, 1958, 1963; Reed, 1960).

This study adds new information regarding species previously reported from Split Rock that are poorly represented in older collections. Included is the first report of associated teeth of the Split Rock chipmunk, *Tamias* sp., of the jaw of *Protospermophilus kelloggi*, and of the association of M2-3 of *Plesiosminthus* (*Schaubeumys*) *sabrae*. Supplemental material is also discussed as it adds to a knowledge of these species.

The material included here was collected by the author or Dr. Craig C. Black during the course of field seasons in 1970 and 1971, and is deposited in the paleontology collection of the University of Kansas Museum of Natural History (KU). The author wishes to express his appreciation to Dr. Black for his help and critical review of the manuscript and also to Mr. Donald L. Rasmussen for his fine work on the stereo photography. Thanks are also due to my wife, Jere, for her field assistance and the Museum of Natural History at Kansas for financial support.

## Family Sciuridae

### **Tamias** sp.

Black (1963) reported several small sciurids from various Tertiary localities in North America and designated them *Tamias* sp. This was not meant to imply that these specimens were necessarily members of the modern genus *Tamias*, but only that generic separation was impossible based on the material at hand. He reported a single lower molar of *Tamias* from Split Rock in 1963. Since that time, another lower molar has been obtained as well as an associated M2-3, the first such association reported from the Miocene of North America.

*Material.*—KU 16858, lM2-3; KU 16964, rml or 2.

*Description.*—The maxillary fragment (KU 16858) contains two teeth that are quite worn, but not enough to obliterate the crown pattern. The lower molar (KU 16964) is in excellent condition with little wear evident.

The anterior cingulum of M2 is relatively wide and extends to the base of the parastyle. The valley separating the parastyle from the paracone is much shallower than that between the anterior cingulum and the protocone. A small mesostyle may be present near the posterior margin of the paracone. The protocone unites the protoloph and metaloph with the anterior cingulum as wear proceeds. The metaloph, which is similar to that of modern *Tamias* and *Eutamias*, contains no metaconule. There is a short posterior cingulum.

The anterior cingulum of M3 is similar to that of M2. The protoloph has no protoconule and the metaloph is absent. A slight indication of a mesostyle occurs on the buccal margin of the central basin. There is no posterointernal expansion of the posterior margin of the tooth, resulting in a shape that is more triangular than square.

The protoconid of the lower first or second molar is high; the anterior cingulum arises from its internal margin and terminates in an anteroconid, which is separated from the metaconid by a deep valley. The metalophid also is absent, resulting in an isolated metaconid. A

→

Fig. 1.—Rodents from the Split Rock local fauna: A, *Tamias* sp., KU 16858, fragment of left maxilla with M2-3, ×7; B, *Tamias* sp., KU 16964, right m1-2, ×7; C, *Plesiosminthus* (*Schaubeumys*) *sabrae*, KU 19404, fragment of right maxilla with M2-3, ×7; D, *Plesiosminthus* (*Schaubeumys*) *sabrae*, KU 19403, fragment of right lower jaw with m2-3, ×7; E, *Plesiosminthus* (*Schaubeumys*) *sabrae*, KU 19402, fragment of left lower jaw with m1-3, lateral view, ×7; F, *Plesiosminthus* (*Schaubeumys*) *sabrae*, KU 19402, fragment of left lower jaw with m1-3, occlusal view, ×7; G, *Protospermophilus kelloggi*, KU 19401, left lower jaw with p4-m2, ×1.5.

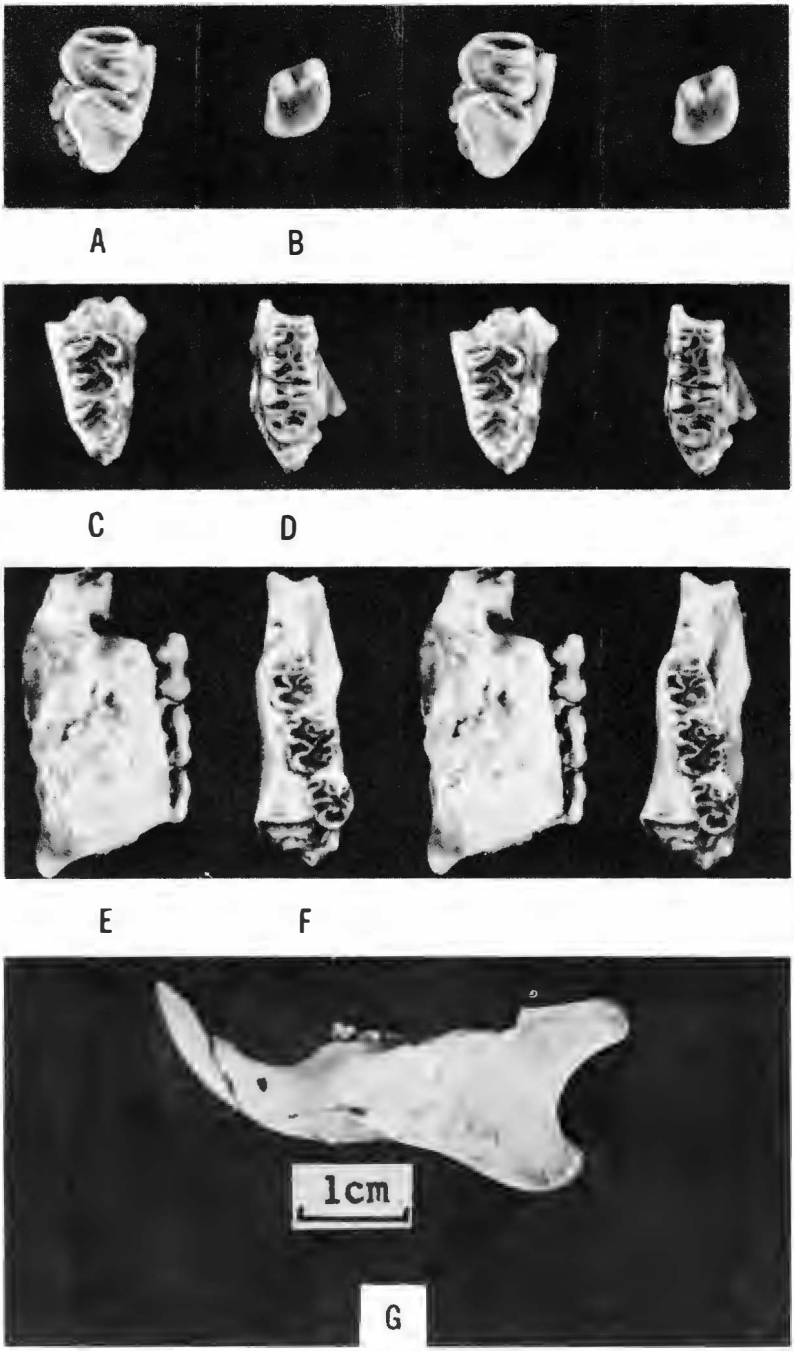
A
B
C
D
E
F
1cm
G

TABLE 1.—*Measurements of rodents from Split Rock. All measurements are in millimeters. Where two transverse measurements are given, the first refers to the protoloph(id) and the second to the metaloph(id).*

| Specimen | A-P | Transverse |
|---|---|---|
| | *Tamias* sp. | |
| KU 16858 | | |
| M2 | 1.19 | 1.54 |
| M3 | 1.39 | 1.42 |
| KU 16964 | | |
| m1 or 2 | 1.23 | 1.45 |
| | *Plesiosminthus* (*S.*) *sabrae* | |
| KU 19404 | | |
| M2 | 1.18 | 1.20-1.06 |
| M3 | .74 | .91 |
| KU 19402 | | |
| m1-3 | 3.64 | |
| m1 | 1.27 | .83-1.00 |
| m2 | 1.16 | 1.07-1.04 |
| m3 | 1.08 | 1.00 |
| KU 19403 | | |
| m2 | 1.20 | 1.04-1.10 |
| m3 | 1.04 | .93 |
| | *Protospermophilus kelloggi* | |
| KU 19404 | | Total length—44.8 |

mesostylid is present on the anterointernal margin of the entoconid and is isolated from the metaconid by a deep valley. There is no mesoconid on the ectolophid. The posteroloph terminates at the entoconid and does not have a distinct hypoconid. The central basin is deep.

*Discussion.*—These additional specimens provide further insight into the relationships of these early chipmunklike sciurids. The Split Rock *Tamias* is the smallest North American sciurid reported, and is smaller than almost all known European sciurids, *Blackia* (Mein, 1970) excepted. The lower molar described above agrees perfectly with Black's (1963) illustration and description of a Split Rock specimen at the University of Wyoming. The upper molars bear out his suspicion of a structural tie between Split Rock and Thomas Farm specimens. Aside from the larger size of the chipmunk from Martin Canyon Quarry A, northeastern Colorado (Wilson, 1960; Black, 1963), the Split Rock M2 has a small mesostyle lacking in the Quarry

A specimen. The Split Rock *Tamias* agrees with the Thomas Farm specimen in its small size, general outline, and unexpanded posterior cingulum.

**Protospermophilus kelloggi** Black, 1963

This species has been known previously only from isolated teeth, which are common at the Split Rock locality. The new specimen represents the first reasonably complete jaw and associated teeth to be reported for the species.

*Material.*—KU 19401, lower jaw with p4-m2.

*Description.*—The jaw is similar in general configuration to that of other members of the genus as illustrated by Black (1963). The diastema slopes away from the p4 a bit more abruptly than in *P. oregonensis*, but not so steeply as in the marmots. The mental foramen is oblong, flattened ventrally, and located near the center of the diastema (although somewhat lower than in the other figured specimens). The tip of the mandible is at the same level as the alveoli.

The masseteric fossa originates at the level of the anterior border of the m1 and diverges rapidly into a pronounced dorsal and ventral masseteric crest for insertion of the lateral and medial masseter, respectively. A small oval depression is located at the anterior margin of the masseteric fossa and may receive an anterior slip of the lateral masseter.

The angular process extends posteriorly to the same level as the condyloid process and is well developed along its ventral and posterior margins to receive parts of the lateral and superficial masseter. The angle is inflected medially, probably carrying the superficial masseter along as it developed. A well-developed fossa exists on the condyloid process to receive the posterior portion of the medial masseter.

A large inferior pterygoid fossa, which extends almost to the level of m3, is present medially for insertion of the large internal pterygoid muscle.

The full extent of the symphysis cannot be ascertained due to breakage, but presumably it extends to the base of the jaw at the midline of the diastema. The teeth are badly worn but compare favorably with those reported from Split Rock (Black, 1963) in general size and configuration.

*Discussion.*—This specimen does not appreciably alter the information that already is available for the species, but does add new knowledge and emphasizes its affinities with other members of the genus. The jaw more closely resembles that of *P. angusticeps* of the Great Plains than *P. oregonensis* of the Great Basin, due primarily to

the presence of the small depression on the anterior margin of the masseteric fossa. The angular process is noticeably inflected in *P. kelloggi*, but information on the other two is inconclusive due to the fragmentary nature of the specimens thus far reported.

## Family Zapodidae

### **Plesiosminthus (Schaubeumys) sabrae** (Black, 1958)

One of the specimens represents the first record of associated m2-3 of *Plesiosminthus* (*Schaubeumys*) *sabrae*. In addition, a partial jaw with m1-3 also is discussed.

Black (1958) described *Schaubeumys sabrae* from the Split Rock local fauna. Since that time no new information regarding this small sicistine has been published. Wilson (1960) used Black's information and material to unite three genera, *Schaubeumys*, *Parasminthus*, and *Plesiosminthus*, which he recognized as subgenera of *Plesiosminthus*. I follow Wilson (1960) in this paper.

*Material.*—KU 19402, jaw with m1-3; KU 19403, jaw with m2-3; KU 19404, maxillary fragment with M2-3.

*Description.*—The maxillary fragment is composed mainly of the M2-3, held together by a small piece of the maxillary bone. The teeth are worn, but a distinctive occlusal pattern still can be seen.

The M2 is slightly wider anteriorly than posteriorly. The protoloph forms an inverted "V," with the paracone joining the protocone through a union with the anterocone. The anteroloph reaches the anterior margin of the tooth when it intersects with the anterior cingulum, which in turn unites with the base of the paracone. A connection through a protolophule I to form the protoloph may exist and the endoloph does not connect anteriorly with the labial margin of the tooth. The mesoloph does not reach the labial margin of the tooth and probably is separate from the mesostyle in earlier stages of wear. The metacone is shorter and more compressed anteroposteriorly than the paracone and is transverse in orientation rather than diagonal, as is the paracone. The protocone and hypocone both are low and anteriorly directed, the latter giving rise to a short posterior cingulum that does not join with the metacone.

The M3 is roughly triangular in shape, the widest point being across the paracone-protocone. The anterior half of the tooth is much better developed than the posterior half. The paracone is high, compressed, and connects directly through a protolophule I to the anterior cingulum; the latter returns to the base of the paracone, creating a basin between the two lophs. The protocone is small and connects with the

anterocone, which unites with the anterior cingulum and protolophule I of the paracone. The lingual fold is again uninterrupted and communicates with the labial margin of the tooth; the endoloph makes no contact with the anterior portion of the tooth. The mesoloph reaches the labial margin of the tooth and a distinct mesostyle may be obvious in earlier stages of wear, but not on worn teeth. The metacone is low and anteriorly directed. The hypocone also is small and possibly connects directly to the metacone along the rear margin of the tooth. There is no detectible posterior cingulum.

*Discussion.*—The North American taxon closest in size and structure to *P.* (*S.*) *sabrae* is *P.* (*S.*) *galbreathi* from Quarry A (Wilson, 1960). *P.* (*S.*) *sabrae* differes in several important features of the M2 from *P.* (*S.*) *galbreathi* as follows: in *P.* (*S.*) *sabrae* the anterior cusps and lophs are completely isolated due to an incomplete endoloph; the M2 is wider anteriorly in relation to the posterior of the tooth; and the metacone tends to be more transverse. The M3 is more triangular in outline. The direct connection of paracone to anterior cingulum and the incomplete endoloph distinguish *P.* (*S.*) *sabrae* from *P.* (*S.*) *galbreathi*.

The lower dentitions differ as pointed out by Wilson (1960) as well as other features. In *P.* (*S.*) *sabrae* the coronoid process originates at the level of the posterior margin of the second molar, whereas in *P.* (*S.*) *galbreathi* it originates farther forward near the anterior margin of the second molar. In general appearance the jaw is more massive in *P.* (*S.*) *sabrae* than in *P.* (*S.*) *galbreathi*, but is not as deep and has a shorter diastema.

Both *P.* (*S.*) *sabrae* and *P.* (*S.*) *galbreathi*, as well as the smaller *P.* (*S.*) *clivosus* (Galbreath, 1953), emphasize the shearing component of mastication as their dentitions tend to be highly terraced (Hershkovitz, 1967). This is especially obvious when the teeth are compared to the European *P.* (*Plesiosminthus*) *myarion*, which has a tendency to be plannar in its dental specializations. The increase in height of the paracone and metacone leading to the terraced dentitions is not limited to North American taxa, but is found also in the Oligocene *P.* (*S.*) *schaubi* and possibly in *P.* (*Parasminthus*) of Europe and Asia, respectively.

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